Installation Checklist – HP ProLiant Cluster F500 for Enterprise Virtual Array using Microsoft Windows Server 2003, Enterprise Edition

May 2004

Table of Contents

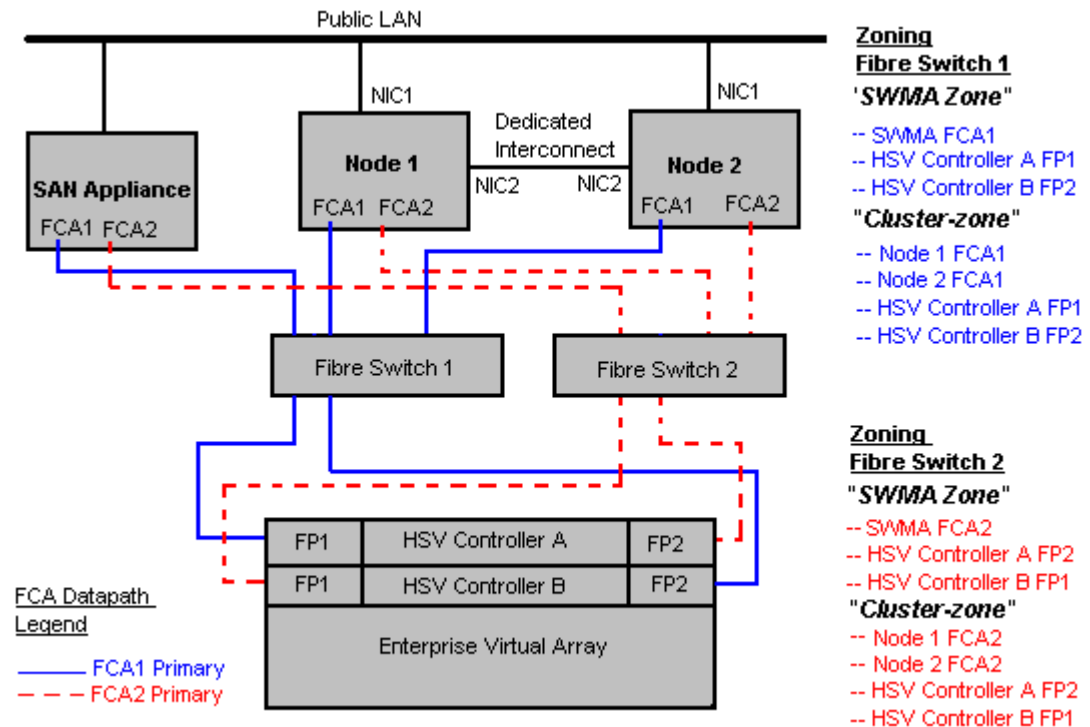# ProLiant Cluster F500 for Enterprise Virtual Array

The HP ProLiant Cluster F500 for Enterprise Virtual Array is a cluster solution made up of a ProLiant Cluster F500 for the Enterprise SAN Cluster Kit, high-end or high-density ProLiant servers, StorageWorks Enterprise Virtual Array storage systems, and a Microsoft Windows cluster capable operating system. The HP ProLiant Cluster F500 for Enterprise Virtual Array (EVA) is a scalable enterprise cluster for mission critical applications.

Key features of the ProLiant Cluster F500 for EVA include:

- Support for the EVA5000 and EVA3000 storage arrays

- Multi-path software allows maximum availability with no single point of failure

- Scalable SANs designed to maximize cluster performance, uptime and storage capacity

- Disaster tolerant solutions to protect mission critical applications across geographies

- Unified suite of HP cluster management tools offer management capabilities to simplify the installation of complex clustered SAN configurations

- Supported in a shared fabric environment

Hardware Cabling and Zoning Scheme

Figure 1. Hardware cabling and zoning scheme

Note: This diagram depicts a two-node cluster. Using Microsoft Windows Server 2003, Enterprise Edition, HP supports up to eight (8) nodes in a ProLiant Cluster F500 for EVA.

Introduction

Microsoft Windows Server 2003, Enterprise Edition is an extension of the Microsoft Windows 2000 operating system environment developed to enhance the customer experience and to improve the overall usability and deployment.

General cluster improvements for Microsoft Windows Server 2003, Enterprise Edition include:

- **Larger cluster sizes –** Enterprise Edition now supports up to 8 nodes.

- **Enhanced cluster installation wizard –** built-in validation and verification function to help ensure base components are ready to be clustered.

- **Installation –** cluster binaries are automatically copied during the operating system installation.

- **Multi-node addition –** multiple nodes can be added in a single operation instead of one by one.

- **Active Directory integration –** tighter integration including a "virtual" computer object, Kerberos authentication, and a default location for services to publish service control points. Users can access the virtual server just like any other Windows server.

This checklist provides step-by-step ProLiant Cluster F500 for EVA operating system installation and cluster configuration directions using Microsoft Windows Server 2003, Enterprise Edition.

Software and Hardware Pre-Checks

The following table provides a checklist of the required software versions and, if applicable, any items to execute before beginning the installation. Place a checkmark (✓) in the box after completing each step.

✓	Software and Hardware Pre-Checks
☐	Before installing your HP ProLiant F500 for EVA cluster solution, it is very important to refer to the HP Cluster Configuration Support website for details on components that make up a valid cluster configuration. There is a support matrix for each HP Cluster that details components that represent quality tested and supported HP Cluster configurations. Using the link below, select the appropriate operating system and storage platform and then refer to the row of deliverables that are relevant to the configuration you require. The HP Cluster Configuration Support website can be found at http:/h18022.www1.hp.com/solutions/enterprise/highavailability/answercenter/configuration-all.html
☐	SmartStart CD.
☐	Two to eight supported ProLiant Servers, two supported Fibre Channel Adapters (FCA) per server, two or more supported network adapters per server, two supported fibre channel switches or hubs, and one or more EVAs per cluster.
☐	Review and understand any Read This First (RTF) and Getting Started cards that were shipped with the product.
☐	Microsoft Windows Server 2003, Enterprise Edition software and documentation.
☐	If applicable, Microsoft Windows Server 2003, Enterprise Edition Service Pack.
☐	HP Insight Manager (optional).
☐	One HP OpenView Storage Management Appliance.
☐	HP StorageWorks Command View EVA software.
☐	HP StorageWorks Windows Kit for Enterprise Virtual Array for FCA driver.
☐	EVA firmware for EVA5000 or EVA firmware for EVA3000.
☐	FCA firmware and boot bios.
☐	Fibre Channel switch firmware.
☐	HP StorageWorks Secure Path for Windows (Included in the ProLiant Cluster F500 for the Enterprise SAN Cluster Kit).
☐	Sufficient software rights to install the operating system and software applications on each node.
☐	Ensure all hardware is installed and properly cabled as shown in **figure 1** - hardware cabling diagram on page 3.
☐	Install the NICs for the private network (cluster heartbeat interconnect) and the public network in each cluster node.
☐	Install the FCAs in each cluster node. **Best Practice:** If the server is equipped with multiple buses, it is recommended to install each FCA on a different bus.
☐	Cable the private NIC in each cluster node. You may use the Ethernet Crossover cable included in your cluster kit if desired for a two-node cluster.
☐	Cable the FCAs to the switches (or hubs) in each cluster node.

> **Note:** The configuration steps detailed in this document are for a switched environment only.

☐ Cable the EVA storage subsystem(s) to the switches or hubs.

☐ Cable the LAN using an Ethernet cable from the public NIC in each cluster node to the public LAN switch or hub.

Gathering Information

The following table provides a checklist for the required input parameters that will facilitate the operating system and cluster installation. Write the information in the values column next to each item. Place a checkmark **(✓)** in the box after completing each step.

✓	Item	Values	
☐	Name for each node (Microsoft Windows Server 2003, Enterprise Edition supports up to eight (8) nodes in a cluster):	Node 1:	Node 2:
		Node 3:	Node 4:
		Node 5:	Node 6:
		Node 7:	Node 8:
☐	Public network connection IP address and subnet mask for each node:	Node 1	Node 2
		IP address: Subnet mask:	IP address: Subnet mask:
		Node 3	Node 4
		IP address: Subnet mask:	IP address: Subnet mask:
		Node 5	Node 6
		IP address: Subnet mask:	IP address: Subnet mask:
		Node 7	Node 8
		IP address: Subnet mask:	IP address: Subnet mask:
☐	Private network connection (cluster heartbeat) IP address and subnet mask for each node:	Node 1	Node 2
		IP address: Subnet mask:	IP address: Subnet mask:
		Node 3	Node 4
		IP address: Subnet mask:	IP address: Subnet mask:
		Node 5	Node 6
		IP address: Subnet mask:	IP address: Subnet mask:
		Node 7	Node 8
		IP address: Subnet mask:	IP address: Subnet mask:

☐ WWID, slot number, and bus of each FCA for each node:	Node 1	Node 2
	FCA 1 WWID:	FCA 1 WWID:
	FCA 1 slot and bus:	FCA 1 slot and bus:
	FCA 2 WWID:	FCA 2 WWID:
	FCA 2 slot and bus:	FCA 2 slot and bus:
	Node 3	Node 4
	FCA 1 WWID:	FCA 1 WWID:
	FCA 1 slot and bus:	FCA 1 slot and bus:
	FCA 2 WWID:	FCA 2 WWID:
	FCA 2 slot and bus:	FCA 2 slot and bus:
	Node 5	Node 6
	FCA 1 WWID:	FCA 1 WWID:
	FCA 1 slot and bus:	FCA 1 slot and bus:
	FCA 2 WWID:	FCA 2 WWID:
	FCA 2 slot and bus:	FCA 2 slot and bus:
	Node 7	Node 8
	FCA 1 WWID:	FCA 1 WWID:
	FCA 1 slot and bus:	FCA 1 slot and bus:
	FCA 2 WWID:	FCA 2 WWID:
	FCA 2 slot and bus:	FCA 2 slot and bus:

☐	Cluster name:	
☐	Cluster IP address and subnet mask:	IP address: Subnet mask:
☐	Default gateway address:	IP address:
☐	WINS server address:	IP address:
☐	DNS address:	IP address:
☐	Local machine Administrator password (used during OS installation):	Know the Administrator password
☐	Domain name:	
☐	Domain administrator user name and password (used during OS installation to have the machine join the domain):	Know the user name and password
☐	Domain account name and password for cluster service (this account has special privileges on each cluster node):	Know the user name and password

Configuring the HP OpenView Storage Management Appliance

The following table provides a checklist of the configuration steps for the HP OpenView Storage Management Appliance. Place a checkmark **(✓)** in the box after completing each step.

✓	Configuring the HP OpenView Storage Management Appliance
☐	Connect the EVA to the Fibre Channel switches. The F500 supports the cross-cable configuration. Please verify that the cabling is configured using this supported method. For more information regarding the F500, please visit http://h18000.www1.hp.com/solutions/enterprise/highavailability/microsoft/haf500/index-eva.html
☐	Power on the EVA subsystem.
☐	Enter the WWID of the subsystem via the Operator Control Panel (OCP).
☐	Power on the HP OpenView Storage Management Appliance. Refer to the HP OpenView Storage Management Appliance documentation for detailed installation and configuration instructions. http://h18000.www1.hp.com/products/sanworks/managementappliance/documentation.html
☐	Log into the Storage Management Appliance from any network browser. **Note:** The default username and password is **administrator**.
☐	Install the HP StorageWorks Command View EVA software for the Storage Management Appliance. Insert the HP StorageWorks Command View EVA CD. Select **Application →Installation Services→Install Products.** Select **CDROM→Next Step** and follow the on-screen instructions to continue.
☐	Cable the Storage Management Appliance to the SAN. Refer to **figure 1** - hardware cabling diagram on page 3.
☐	Connect the Storage Management Appliance to the ethernet network. **Note:** You must have a working network to configure the storage subsystem via the Storage Management Appliance.
☐	Configure the zone for the Storage Management Appliance. Using telnet or the Fibre Channel switch graphical user interface (GUI), create a Fibre Channel zone that consists of the WWIDs of the FCAs in the Storage Management Appliance and the WWIDs of the HSV controller ports. For more information regarding zoning, please refer to the Zoning User's Guide located at http://h18004.www1.hp.com/solutions/enterprise/highavailability/whitepapers/ms-eva.html

Installing Node 1 Operating System

The following table provides a checklist of the operating system installation steps for Node 1. Place a checkmark **(✓)** in the box after completing each step.

✓	Installing Node 1 Operating System
☐	Power on Node 1.
☐	After the array controller initializes, press the **F8** key to enter the Option ROM Configuration for Arrays (ORCA).
☐	Create a primary boot partition on the server.
☐	Exit the ORCA utility.
☐	Boot the server with the SmartStart CD in the CD-ROM drive. **Note:** The instructions below are for SmartStart 6.x or later. Please refer to SmartStart 5.50 documentation for pre-Generation 2 servers.
☐	Select the desired language from the Select Language screen.
☐	Follow the SmartStart on-screen instructions. Insert the operating system CD when prompted to complete the installation process.
☐	Each cluster node requires at least two network adapters—one connected to a public network, and one connected to a private network. *For the public network connection:* If the network adapter can transmit at multiple speeds, then manually specify a speed and duplex mode. The speed for the network adapter should be hard set (manually set) to be the same on all nodes

according to the card manufacturer's specification.

Best Practice: To provide a maximum level of redundancy, use NIC Teaming capabilities for selected HP network products to provide a redundant public network connection. Please note, however, that NIC Teaming is not supported for the private network connection.

☐ Configure the TCP/IP settings for the public network connection.

☐ *For the private network connection*: To eliminate possible private network cluster communication issues, refer to Microsoft Knowledge Base (KB) article **258750** to properly setup the private network. http://support.microsoft.com/default.aspx?scid=kb;en-us;258750

☐ Configure the TCP/IP settings for the private network connection.

☐ Join the Microsoft Windows Domain and reboot when prompted.

☐ After the reboot, log the machine into the domain.

☐ Install the FCA device drivers.

Insert the HP StorageWorks Windows Kit for Enterprise Virtual Array CD into the server CD-ROM drive. If autorun is enabled, the installation program starts. Otherwise, navigate to the root of the CD and double-click launch.exe.

Click **Solution Software for Windows NT/2000/Server 2003**. Click **Perform Multi Driver Update/Install** to start the driver update utility.

Note: When the driver update utility installation finishes, **DO NOT** reboot. Proceed to the next step before rebooting.

☐ Install the Fibre Channel software.

Select **Run Fibre Channel Utility** to start the Fibre Channel setup wizard. If more than 5 Windows servers will have exclusive access to the same EVA, the **Extended Configuration** option should be selected.

☐ Reboot after the installation of the Fibre Channel software.

☐ Install HP StorageWorks Secure Path for Windows software.

Insert the HP StorageWorks Secure Path for Windows CD into the server CD-ROM drive. Select **Install secure path** and follow the on-screen instructions.

Note: Verify that reverse lookup is configured correctly on the Domain Name System (DNS) server if you are using Fully Qualified Domain Names (FQDN).

☐ Reboot Node 1.

☐ Configure the cluster zone for Node 1.

Using telnet or the Fibre Channel switch graphical user interfaces (GUI), configure the cluster zone. The cluster zone will consist of the WWIDs of the FCA in Node 1 and the WWIDs of the HSV controller ports.

For more information regarding zoning, please refer to Zoning User's Guide located at http://h18004.www1.hp.com/solutions/enterprise/highavailability/whitepapers/ms-eva.html

Note: After installing the FCA driver and Fibre Channel Software, the FCA will register its WWID with the fabric switch. There should be a minimum of two zones created. One of the zones will consist of the Storage Management Appliance and the HSV controller ports, and the other zone will consist of both cluster nodes and the HSV controller ports.

☐ When the installation is complete, shutdown Node 1.

Installing Node 2+ Operating System

The following table provides a checklist of the operating system installation steps for Node 2+. Place a checkmark **(✓)** in the box after completing each step.

Note: Microsoft Windows Server 2003, Enterprise Edition supports a maximum of 8 cluster nodes. Repeat the following operating system installation steps for each additional node.

✓	Installing Node 2+ Operating System
☐	Power on Node 2.
☐	After the array controller initializes, press the **F8** key to enter the Option ROM Configuration for Arrays (ORCA).
☐	Create a primary boot partition on the server.
☐	Exit the ORCA utility.
☐	Boot the server with the SmartStart CD in the CD-ROM drive. **Note:** The instructions below are for SmartStart 6.x or later. Please refer to SmartStart 5.50 documentation for pre-Generation 2 servers.
☐	Select the desired language from the Select Language screen.
☐	Follow the SmartStart on-screen instructions. Insert the operating system CD when prompted to complete the installation process.
☐	Each cluster node requires at least two network adapters—one connected to a public network, and one connected to a private network. _For the public network connection_: If the network adapter can transmit at multiple speeds, then manually specify a speed and duplex mode. The speed for the network adapter should be hard set (manually set) to be the same on all nodes according to the card manufacturer's specification. **Best Practice:** To provide a maximum level of redundancy, use NIC Teaming capabilities for selected HP network products to provide a redundant public network connection. Please note, however, that NIC Teaming is not supported for the private network connection.
☐	Configure the TCP/IP settings for the public network connection.
☐	_For the private network connection_: To eliminate possible private network cluster communication issues, refer to Microsoft Knowledge Base (KB) article **258750** to properly setup the private network. http://support.microsoft.com/default.aspx?scid=kb;en-us;258750
☐	Configure the TCP/IP settings for the private network connection.
☐	Join the Microsoft Windows Domain and reboot when prompted.
☐	After the reboot, log the machine into the domain.
☐	Install the FCA device drivers. Insert the HP StorageWorks Windows Kit for Enterprise Virtual Array CD into the server CD-ROM drive. If autorun is enabled, the installation program starts. Otherwise, navigate to the root of the CD and double-click launch.exe. Click **Solution Software for Windows NT/2000/Server 2003**. Click **Perform Multi Driver Install/Update** to start the driver update utility. **Note:** When the driver update utility installation finishes, **DO NOT** reboot. Proceed to the next step before rebooting.
☐	Install the Fibre Channel software. Select **Run Fibre Channel Utility** to start the Fibre Channel setup wizard. If more than 5 Windows servers will have exclusive access to the same EVA, the **Extended Configuration** option should be selected.
☐	Reboot after the installation of the Fibre Channel Software.
☐	Install HP StorageWorks Secure Path for Windows software. Insert the HP StorageWorks Secure Path for Windows CD into the server CD-ROM drive. Select **Install secure path** and follow the on-screen instructions. **Note:** Verify that reverse lookup is configured correctly on the Domain Name System (DNS) server if you are using Fully Qualified Domain Names (FQDN).
☐	Reboot Node 2.
☐	Configure the cluster zone for Node 2. Using telnet or the Fibre Channel switch graphical user interfaces (GUI), configure the cluster zone. The cluster zone will consist of the WWID of the FCAs in Node 2 and the WWIDs of the HSV controller ports. For more detail information regarding zoning, please refer to the Zoning User's Guide located at http://h18000.www1.hp.com/solutions/enterprise/highavailability/whitepapers/ms-eva.html **Note:** After installing the FCA driver and Fibre Channel software, the FCA will register its WWID with the fabric switch. There should be a minimum of two zones created. One of the zones will consist of the Storage Management Appliance and the HSV controller ports, and the other zone will consist of both cluster nodes and the HSV controller ports.

| ☐ | When the installation is complete, shutdown Node 2. |
| ☐ | Microsoft Windows Server 2003, Enterprise Edition supports up to 8 nodes in a cluster. Repeat the installation instructions on any additional nodes that will join the cluster. |

Configuring the Shared Storage

The following table provides a checklist of the steps necessary to configure the EVA shared storage. Place a checkmark (✓) in the box after completing each step.

✓	Configuring the Shared Storage
☐	Power on both nodes and log into the network domain.
☐	Verify the FCAs have the most current supported firmware. Verify the FCAs firmware by accessing the lputilnt utility. However, do not make any driver parameter changes using this utility. Select **Start → run → \winnt\system32\lputilnt**
☐	Log into the Storage Management Appliance.
☐	Launch HP StorageWorks Command View EVA. Select **Devices→Command view**
☐	Click on the uninitialized storage subsystem by clicking on **Uninitialized Storage System→Initialize**. **Note**: If this is the first time the Storage Management Appliance sees the EVA, a basic license is required to continue configuring the subsystem.
☐	Configure the disk groups. A disk group cannot contain less than eight disks. **Note:** Decide how many disk groups are going to be created on the subsystem. The EVA can be configured with a single default disk group that consists of all the physical disks in the subsystem or it can be configured with multiple disk groups.
☐	Set the storage subsystem time.
☐	Add all cluster nodes to the EVA. Select your EVA and then select **Hosts.** Click **Add a Host** and enter a host name and IP address. Click **Next Step** and enter an adapter port World Wide ID (WWID). Use the information that was gathered before installing the FCAs in the server. Select **Microsoft Windows** as the operating system. Click **Next Step.** Click **Finish, OK.** **Note:** If the wrong IP address is entered and saved, it cannot be changed. You will have to delete and recreate the host.
☐	Add the second FCA to the host. Click **Add a Port.** Select the second FCA from the list that was installed in the host. Click **Finish, OK**. Repeat these steps for the second host.
☐	Create Virtual Disks. Select **Virtual Disks.** Click **Create VD Fam.** Enter a virtual disk name. Select **Vraid.** Select a preferred path - either **Path A-Failover only** or **Path B-Failover only.** Click **Finish, OK**. Repeat these steps to create the virtual disks that are required. **Note:** With Windows hosts, the only supported path settings are either **Path A-Failover only** or **Path B-Failover only**. A windows host requires Secure Path to manage the failover/failback operations.
☐	Present the Virtual Disks to the cluster nodes. Select a virtual disk, click **Present.** Select a host. Click **Finish, OK.** Click **Present.** Select the second host. Click **Finish, OK**. Select another virtual disk and repeat these steps until all the virtual disks in the cluster are presented to all hosts. **Note:** Verify that the LUNs are presented to all nodes with the same LUN number.

☐	Configure the Virtual Disks on Node 1. Power down Node 2. From the desktop of Node 1, select **Start → Programs → Administrative Tools → Computer Management**. Then select **Disk Management** to create volumes out of the logical drives. **Note:** Configure the virtual disks on one node at a time. Do not upgrade the logical drives from Basic to Dynamic. Microsoft Cluster Services does not support dynamic disks.
☐	Be sure to assign drive letters and format the volumes as NTFS partitions. It is a good practice to provide a volume label to help identify the drives.
☐	Close **Disk Management**.

Creating the Cluster

The following table provides a checklist for creating the cluster from Node 1. Place a checkmark **(✓)** in the box after completing each step.

✓	Creating the Cluster
☐	From the desktop of Node1: Select **Start → Programs → Administrative Tools → Cluster Administrator**.
☐	Select **Create New Cluster** from the *Action* drop-down box. Click **OK**.
☐	Click **Next** on the welcome screen.
☐	Select the domain to create the cluster in and enter a name for the cluster. Click **Next**.
☐	Enter the name of the first server to be in the cluster. Click **Next**.
☐	When the cluster configuration wizard finishes analyzing the configuration, click **Next**.
☐	Enter the IP address for the cluster. Click **Next**.
☐	Enter the username and password for the cluster. Click **Next**.
☐	Verify the proposed cluster configuration. Click **Next**.
☐	When the cluster configuration wizard has finished creating the cluster, click **Next** and then click **Finish**.
☐	Select **Start → Control Panel → HP Management Agents**. In the list of **Inactive Agents,** select **Clustering Information** and click **Add** to move this agent to the list of active agents and click **OK**.
☐	Restart the agents when prompted.

Joining Node 2+ to the Cluster

The following table provides a checklist for the process of joining Node 2+ to the cluster. Place a checkmark **(✓)** in the box after completing each step.

Note: Microsoft Windows Server 2003, Enterprise Edition supports a maximum of 8 cluster nodes. Repeat the following steps for each additional node.

✓	Joining Node 2+ to the Cluster
☐	Power on Node 2.
☐	From Node 2, select **Start → Programs → Administrative Tools → Cluster Administrator**.
☐	Select **Add nodes to cluster** from the *Action* drop-down box. Enter the name of the cluster to join, click **OK**.
☐	Click **Next** on the welcome screen.
☐	Enter the name of the server that you want to join the cluster, click **Add** and the click **Next**.
☐	When the cluster configuration wizard finishes analyzing the configuration, click **Next.**
☐	Enter the user name and password for the cluster. Click **Next**.
☐	Verify the proposed cluster configuration. Click **Next**.

☐	When the cluster configuration wizard has finished adding the node to the cluster, click **Next** and then click **Finish**.
☐	Select **Start →Control Panel → HP Management Agents**. In the list of **Inactive Agents,** select **Clustering Information** and click **Add** to move this agent to the list of active agents and click **OK**.
☐	Restart the agents when prompted.
☐	Microsoft Windows Server 2003, Enterprise Edition supports up to 8 nodes in a cluster. Repeat the **joining node 2+ to the cluster** installation instructions for each additional node.

Validating the Cluster Configuration

To validate the cluster installation, perform the following steps from any cluster node. Place a checkmark **(✓)** in the box after completing each step.

✓	**Validating the Cluster Configuration**
☐	From the desktop of any node: Select **Start → Programs → Administrative Tools → Cluster Administrator**, and connect to the cluster.
☐	Right click on one of the cluster groups and select **Move Group**.
☐	Verify the group fails over and all resources come online.
☐	Right click on the same cluster group and select **Move Group**.
☐	Verify that the group fails over and all resources come online.
☐	Repeat the **validating the cluster configuration** steps, for each group.

The installation is now complete.

For more Information

To learn more about HP High Availability and ProLiant Clusters visit the following Web site: http://www.hp.com/servers/proliant/highavailability.

Feedback

Help us improve our technical communication. Let us know what you think about the technical information in this document. Your feedback is valuable and helps us structure future communications. Please send your comments to hawebserver@hp.com.

365192-001